CLAIMS

What is claimed is:

1. A method for forming trimetallic nitride endohedral metallofullerenes, comprising the steps of:

charging a reactor with carbon, a nitrogen containing compound, and a metal;

sealing the reactor under vacuum to form a sealed reactor;

heating the sealed reactor at a temperature and for a time effective to form a trimetallic nitride endohedral metallofullerene.

2. The method of claim 1 wherein the metal is a rare earth element or a group IIIB element.

3. The method of claim 1 wherein the metal includes a metal selected from the group consisting of Scandium, Yttrium, Lanthanum, Gadolinium, Holmium, Erbium, Thulium, and Ytterbium.

4. The method of claim 1 wherein the nitrogen containing compound is a metal nitride.

5. The method of claim 1 wherein the sealed reactor is heated to a temperature ranging from about 800 K to about 1800 K.

6. The method of claim 1 wherein the carbon includes C_{60}.

7. The method of claim 1 wherein the metal is supplied in the form of a metal oxide.

8. A method for forming a trimetallic nitride endohedral metallofullerene, comprising the steps of:

charging a reactor with a first metal, a second metal, carbon, and a nitrogen containing compound;

sealing the reactor under vacuum; and

heating the reactor to a temperature and for a time effective to form a trimetallic nitride endohedral metallofullerene.

9. The method of claim 8 wherein the first metal is a rare earth element or a group IIIB element, and the second metal is a rare earth element or a group IIIB element.

10. The method of claim 8 wherein the first metal is selected from the group consisting of Scandium, Yttrium, Lanthanum, Gadolinium, Holmium, Erbium, Thulium, and Ytterbium; and the second metal is different from the first metal and selected from the group consisting of Scandium, Yttrium, Lanthanum, Gadolinium, Holmium, Erbium, Thulium, and Ytterbium.

11. The method of claim 8 wherein the nitrogen containing compound is a metal nitride.

12. The method of claim 8 wherein the first metal is a first metal oxide and the second metal is a second metal oxide.

13. The method of claim 8 wherein the first metal and the second metal are different.

14. The method of claim 8 wherein the carbon includes C_{60}.

15. The method of claim 8 wherein the reactor is heated to a temperature ranging from about 800 K to about 1800 K.

16. The method of claim 8 wherein the trimetallic nitride endohedral metallofullerene has the formula $A_{3-n}X_nN@C_m$, wherein A is the first metal, X is the second metal, n is an integer from 1-3, and m is an even integer from about 60 to about 200.